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Verification of the chemical industry within the general pattern of verification of a Chemical Weapons Convention

1. Introduction

The efforts of the Ad Hoc Committee on Chemical Weapons to define the general pattern of verification for a Chemical Weapons Convention have so far been inconclusive. In particular, major differences of view persist as to the scope and the objectives of verification measures in the chemical industry under Article VI of the draft Convention. This paper attempts to address this issue comprehensively, by suggesting a modified and simplified approach to verification in the chemical industry.

As no part of the verification system can be taken separately, one must, however, have a comprehensive view of the general pattern of verification. The suggestions of this paper are therefore made on the basis of the assumption that there exists agreement on:

- the need for systematic, routine on-site verification, on the basis of facility agreements, regarding chemical weapons and their destruction, chemical weapons production facilities and their destruction, and production of schedule 1 chemicals, in accordance with Articles IV and V, including their Annexes, and in accordance with Annex I to Article VI;

- the need for an effective and comprehensive régime of inspections on request.

On the basis of these assumptions one can conclude that the Convention will be equipped, on the one hand with an effective system to monitor all obligations regarding declared chemical weapons and chemical weapons production facilities as well as declared production of schedule 1 chemicals, and on the other hand with a safety net, covering also all undeclared sites, which will deter against violations and enhance confidence in compliance by all States Parties.

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In addition to these two indispensable parts of the general pattern of verification a system must be established, whereby a sufficient degree of confidence is created that capabilities in the chemical industry are not used in violation of the Convention.

Such a system should, according to the suggestions developed in this paper, concentrate on production of chemicals and be based on declarations, free access and selective inspections. The inspection effort must be seen as non-discriminatory, yet relevant, without causing unmanageable administrative and financial burdens.

2. Outline and analysis of the current provisions for monitoring of the chemical industry

The current provisions establish an elaborate verification system for facilities that produce, process or consume schedule 2 chemicals above a certain threshold.

These facilities have to declare past and planned activities, they are subject to an initial inspection, leading to the elaboration of a facility agreement, on the basis of which systematic routine on-site inspections, including monitoring with instruments, will be carried out.

The verification approach taken to these facilities is similar to that established for the control of fissionable materials under IAEA safeguards, which are based on accountancy control, backed up by containment, surveillance and on-site inspections. However, due to the complex nature of the chemical industry and the limitations of existent provisions on declarations, the Convention cannot establish a verification system based on material balances. As a result, a select group of facilities are subjected to intrusive and costly verification measures, at the same time as large lacunaes are left in the coverage of the system.

Thus, national transfers are not declared, leaving chemical brokers outside. Furthermore, production of schedule 3 chemicals is only subject to monitoring by data reporting, and production capability in facilities not producing schedule 2 chemicals, or producing under a threshold, is left undeclared and unmonitored.

Finally, due to a restrictive interpretation of the term "facility", a declared and inspected schedule 2 facility may consist of one single production unit in a vast plant-site where a number of other production units could very well produce the same chemical. It may therefore be argued that the scope of verification in the chemical industry is very limited.

In spite of these limitations one can, however, assume that in the order of magnitude of 1,000 facilities world-wide would be declared under Annex 2 to Article VI. In accordance with paragraphs 9 and 11 of that Annex all of these facilities shall "promptly" after the entry into force of the Convention receive an initial inspection and have facility agreements agreed upon within six months.

Facility agreements elaborated for the purpose of national trial inspections give little guidance as to realistic time requirements for the elaboration of real facility agreements under the Convention. It could be estimated that the Technical Secretariat would need, on an average, 50-100 man-days for the conclusion of a facility agreement. Thus, in order to comply with the current provisions of the draft Convention, the Technical Secretariat might have to spend 50,000-100,000 man-days only to conclude facility agreements pursuant to Annex 2 to Article VI. This burden comes on top of activities under Articles IV and V as well as under Annex 1 to Article VI.

Furthermore, due to the flexibility of chemical industry, especially in multi-purpose-plants, facilities might want to modify their production processes. In many cases facility agreements would have to be renegotiated. There is a risk that such time-consuming renegotiations will be frequent.

It may be concluded, that the present text of the draft Convention puts an administratively and financially unmanageable burden on the Technical Secretariat, in order to establish a system of verification, which anyway is deemed insufficient by a large number of countries.

Proposals that have been made so far in order to cover the identified verification gaps, in particular various proposals for ad hoc verification measures, have thus been made as additions to a system that already seems to entail serious risks of overburdening the Technical Secretariat and the National Authorities.

3. Suggested outline of declarations and inspections to replace the provisions of Annexes 2 and 3 of Article VI

Summary

The following outline builds on a verification concept which emphasizes increased transparency as an important confidence-building measure and which is aimed at directing verification efforts to plant-sites that are perceived as relevant, while at the same time being distinctly different from inspections on request based on an urgent need for reassurance regarding the activities at the inspected site.

This paper proposes to establish one unified system of verification in the chemical industry based on a qualitative approach, that takes into account the actual production of schedule 2 and schedule 3 chemicals as well as the capability of producing listed chemicals. Such a system could merge elements of the current provisions in Annex 2 to Article VI with elements of proposals regarding ad hoc verification measures. As a result, actual inspection efforts could be reduced, at the same time as the scope of possible inspection efforts would be enlarged in terms of facilities and concentrated in terms of activities.

The basis for this proposal is one single system for declaration of facilities producing any chemical listed on Schedules 2 or 3 and for facilities capable of producing listed chemicals.

The criteria for a facility to supply annual declarations on planned activities are:

- production of any chemical listed on Schedules 2 or 3 above a threshold; or

- production of other discrete chemicals by identified chemical conversion processes above a threshold.

All declared facilities are liable to receive on-site inspection on short notice.

The aim of the inspection will be to verify that ongoing activities are in accordance with the information provided in the declarations on planned activities, including by verification of the absence of non-declared activities subject to declaration.

A facility declaring the production of chemicals listed in Schedules 2 or 3 shall receive an inspection within a specified time-period.

In addition, facilities shall be selected for inspection by the participation of States Parties in the selection process.

An annual declaration on past activities shall also be submitted by the National Authority stating aggregate quantities produced, imported and exported for each chemical listed on Schedules 2 and 3 over the past year. In this declaration, significant deviations from the declarations on planned activities shall also be declared.

4. Detailed outline of the proposed system

4.1. Definition

The term "facility" is taken to mean an entire plant-site, even if only part of this plant-site is used for the production of a chemical listed on Schedules 2 or 3, or uses an identified chemical conversion process. It is suggested that the definition of a plant-site contained in CD/984 be taken as a basis.

4.2. Declarations on planned activities

4.2.1. Declarations on planned activities shall be submitted by the National Authority to the Technical Secretariat for each facility which:

- produces any chemical listed on Schedule 2 or 3 in a quantity above given thresholds; or

- produces any other discrete chemical by use of at least one of a number of specially identified chemical conversion processes with an output in excess of a given threshold. For the purpose of these declarations a Schedule of relevant chemical conversion processes must be established, Schedule 4.

Enclosed is a list of the key chemical conversion processes that are used in the production of the chemicals listed on Schedules 1, 2 A, 2 B and 3. The list should be seen as a basis for consideration of which conversion processes could be included in a Schedule 4.

4.2.2. The declarations on planned activities shall be submitted three months in advance of the next calendar year. They should contain for each facility:

- whether production of any chemical listed on Schedule 2 or 3 above a threshold is anticipated to take place at the facility during the next calendar year, including appropriate details, such as, inter alia, chemical, amount, time for production;

or, if no such production is anticipated in the facility

- whether one or more chemical conversion processes, as listed in Schedule 4, will be used for the production of other discrete chemicals above a threshold. These declarations would not require details regarding actual production nor about the relevant conversion processes. A simple affirmative could suffice.

4.2.3. If, after the submission of the annual declaration on planned activities, additional production of any chemical listed on Schedule 2 or 3, not included in the declaration will take place, it shall be notified, together with appropriate details, to the Technical Secretariat before the production starts.

4.2.4. If, after the submission of the annual declaration on planned activities, a plant-site which has not been declared starts up a production using a conversion process, listed in Schedule 4, the declaration of the plant-site to the Technical Secretariat can be deferred to the next annual declarations on planned and past activities respectively.

4.3. Declarations of past activities

Declarations of past activities shall be submitted by the National Authorities to the Technical Secretariat within three months after the end of each calendar year stating:

- aggregate quantities produced, imported and exported of each chemical listed on Schedule 2 or 3 as well as a quantitative specification of import and export for each country involved;

- quantitative data on any production of chemicals listed on Schedules 2 and 3 at any facility differing by more than [..... per cent] from the data given in the respective declarations on planned activities; and

- any modification to the list of facilities producing discrete chemicals by the chemical conversion processes listed on Schedule 4 with an output above a threshold.

4.4. Inspections

4.4.1. All declared facilities are liable to receive on-site inspections on short notice.

4.4.2. The aim of the inspections shall be:

- to verify that the ongoing activities are in accordance with the information provided in the declaration on planned activities; and

- to verify the absence of any chemicals listed on Schedule 1 at the facility and of any non-declared production of chemicals listed on Schedules 2 and 3 above a threshold.

4.4.3. The activities of the Inspectors shall be aimed at establishing that no activity is carried out that should have been declared. This negative verification objective could be attained without necessarily providing the Inspectors detailed information regarding the actual production at the facility. Legitimate confidentiality requirements of the facility could thereby be safeguarded.

4.4.4. In the course of an inspection the Inspection team shall have the right to select any production plant within the declared facility for inspection. In order to establish the relevant facts they shall proceed from less to more intrusive methods, such as sampling of a production plant, when this is required for removing any uncertainties.

4.4.5. In the absence of facility agreements there would be a need for the elaboration of general provisions regarding procedures for the carrying out of an inspection. Provisions of this kind could be developed in the framework of the Protocol on Inspection Procedures and of the Annex on Confidentiality.

4.5. Selection of facilities to be inspected

4.5.1. Each facility producing a chemical listed on Schedule 2 or 3 in a quantity above given thresholds shall receive one inspection [within .....] after such production at the facility was notified for the first time to the Technical Secretariat. If a new type of such production begins at the facility, an additional inspection might be required.

4.5.2. In addition, each State Party has the right to propose, at facilities declared in accordance with paragraph 4.2. above, on the territory of other States Parties, a maximum of 10 inspections annually, and is under the obligation to propose at least 1 such inspection. The proposals for inspection made by the States Parties shall be communicated to, and treated within, the Technical Secretariat in a way that does not reveal which State Party had proposed a particular facility for inspection. The Technical Secretariat shall randomly select the facilities to be inspected during a certain time-period from the facilities thus suggested. The identity of a facility proposed for inspection but not selected shall not be revealed.

The number of facilities to be inspected annually by this selection principle will, as a maximum, equal the number of proposals for inspection made by the States Parties. No facility shall, however, by this selection receive more than 2 inspections per 12 months' period.

Consequently, the actual maximum number of inspections performed annually by this selection principle may be lower than the number of proposals made by the States Parties if any particular facility is proposed for inspection by States Parties more than twice during a 12 months' period.

4.5.3. A random selection of facilities to be inspected may also be made by the Technical Secretariat among all facilities declared as producing chemicals listed on Schedule 2 or 3 above a threshold to maintain an agreed number of inspections annually if the number of inspections proposed by the States Parties according to paragraph 3.5.2. falls short of that level.

4.6. National implementation

It will be the responsibility of each National Authority to assemble the required information for declarations, according to its national procedures, in order to communicate it to the Technical Secretariat. There will thus be no need for an agreed format of National Registers under the Convention.

4.7. Confidentiality

In the absence of facility agreements there will be no need to store detailed information regarding the facilities at the Technical Secretariat. Such information that the Inspectors obtain during the inspection can be handled and kept inside the plant-site.

5. Differences to the present provisions under Article VI

- processing and consumption of chemicals listed on Schedules 2 and 3 are not subjected to verification measures;
- no facility agreements will be required;
- a Schedule 4 for chemical conversion processes is established;
- selective on-site inspections on short notice will replace systematic routine on-site inspections;
- on-site inspections can take place at facilities producing Schedule 3 chemicals;
- on-site inspections can take place at facilities capable of producing listed chemicals, the capability being indicated by the use of certain chemical conversion processes;
- by using declarations on planned activities as a basis for the verification the inspections can be focused on ongoing activities instead of on past activities;
- the total verification effort in terms of on-site inspection can readily be adjusted to be commensurate with the resources available at the Technical Secretariat;
- objects for inspections may be proposed by States Parties in a non-confrontational way, thus maximizing the cost-effectiveness of the inspection effort without introducing accusations.

Enclosure

1. A basis for the elaboration of Schedule 4 - chemical conversion processes

1. Alkylation
2. Condensation
3. Dehydrogenation
4. Esterification
5. Halogenation
6. Hydrogenation
7. Isomerization
8. Oxidation
9. Substitution

Chemical industrial processes by which reactants are transformed into products can be classified in terms of "chemical conversion processes". Each such process embraces a number of individual reactions or chemical conversions, utilizing the same main types of process equipment under similar reaction conditions.

The above list of chemical conversion processes, which could indicate a capability of producing one or more listed chemicals, was compiled on the basis of the present Schedules 1, 2 A, 2 B and 3. For each listed chemical or family of chemicals, a list of production routes of importance for large-scale production was compiled. Then, for each production route the chemical conversion processes involved were identified. Thus, it was possible to classify each listed chemical or family of chemicals in terms of chemical conversion processes used for its production. This classification is annexed.

It should be noted that less than one third of the generally accepted standard types of chemical conversion processes were used in the classification of the listed chemicals. This suggests that it should be possible to exclude a significant number of chemical industrial facilities from the declarations of facilities capable of producing listed chemicals.

2. Classification of listed chemicals according to chemical conversion processes

A. Schedule 1 chemicals/families of chemicals

No.	Chemical conversion process
1.	Alkylation (other) Substitution (esterification) Halogenation Oxidation (controlled)
2.	Substitution (esterification and other)
3.	Alkylation (other) Substitution (esterification) Oxidation (controlled)
4.	Alkylation (addition to ethylene or vinyl chloride) Halogenation
5.	Alkylation (addition to acetylene)
6.	Halogenation
7.	Esterification
8.	Not applicable - extraction from natural sources
9.	Not applicable - extraction from natural sources
10.	Alkylation (other) Halogenation Oxidation (controlled)
11.	Alkylation (other) Substitution (esterification)
12.	Alkylation (other) Oxidation (controlled) Substitution (esterification)
13.	Identical to Schedule 2, item 11

B. Schedule 2 part A chemicals/families of chemicals

No.	Chemical conversion process
1.	Alkylation (other)
2.	Substitution (other)
3.	Substitution (esterification and other)
4.	Halogenation

5. Condensation
   Isomerization
   Oxidation (controlled)

6. Alkylation (other)
   Condensation
   Esterification
   Hydrogenation

7. Halogenation

8. Alkylation (addition to ethylene oxide)

9. Substitution (other)

10. Alkylation (addition to ethylene oxide or other alkylation)

11. Condensation
    Hydrogenation
    Isomerization

C. Schedule 2 part B chemicals

Amiton	Substitution (esterification)
PFIB	Isomerization

D. Schedule 3 chemicals

1. Halogenation

2. Halogenation

3. Dehydrogenation

4. Halogenation

5. Oxidation (controlled)

6. Halogenation

7. Halogenation

8. Substitution (esterification)

9. Substitution (esterification)

10. Substitution (esterification)

11. Substitution (esterification)

12. Halogenation

13. Halogenation

14. Halogenation